

## **An investigation into the factors which affect the rate of transpiration**

**Aim:** In this investigation I will be investigating how wind speed affects the rate of transpiration in plants.

I have decided to experiment with wind speed because in preliminary tests it proved to be a fair variable and easily controlled.

**Quantitative prediction:** I think that when the wind speed is doubled the rate of transpiration will also double. I think this because as the wind speed increases so must the amount of water that is blown off the leaf, so more water will be taken up increasing the rate of transpiration.

**Theory:** Transpiration is the loss of water from plant leaves (from spongy cells to air spaces and out through the stomata). Therefore, if more water is blown off the leaves, more water must be taken up quicker.

**Safety:** To ensure the safety of all members of the group, I must ensure that the hairdryer is kept a safe distance away from the water and any breakage's are dealt with immediately.

**Fair test specifications:** To make this a fair test I will ensure that the hairdryer is always on the same setting and always on the cool setting so that I only change 1 factor at a time. I also must check that as far as possible the humidity and temperature are kept as consistent as possible so not to make it an unfair test. In preliminary tests I decided to change the distance of the plant to the hairdryer as opposed to changing the speed of the hairdryer. I decided to do this as it is easier to regulate than speed. I have decided these positions will be 10, 20, 30, 40, 50, 60, and I will do each test 3 times and find the averages to make it a fair test. I will also have to make sure that the hairdryer is put at these points and at regular points so it won't affect my results.

**Apparatus list:** In this experiment I will need the following: Potometer to carry out the tests, Thermometer so I can ensure the water is kept the same temperature and that the room temp is kept constant and if not compensate for that, a Hairdryer for imitating my wind, Vaseline to make sure that the potometer is fully water tight, Scalpel to cut the stem of the plant, Water, Light meter-this will help me to regulate the light intensity so it is kept as constant as possible and a ruler or meter stick to mark out the positions at which the hairdryer will sit.

**Method:** Make sure the plant is healthy -big leaves thus a large surface area because a large surface area ensures a better rate of transpiration. Put the water in a beaker and put the potometer in it making sure there is a constant stream of water.

Put colour in the water, so you can see at what rate the transpiration is moving at.

Cut the plant diagonally or horizontally but must be cut under water so no oxygen obstructs the xylem thus rendering the test unfair .

Completely submerge the potometer under water and when there is a constant stream of water allow an air bubble to enter the stream by holding the potometer in the air for a moment. This, along with the colouring will enable us to see the rate at which the plant transpires.

Record how long it takes for the air bubble to reach a certain place within the different wind speeds.

If necessary hold the potometer with a clamp stand to make sure no unwanted air enters the tubes.

Set up the hairdryer at regular intervals, making sure that it is always on the cool setting so only one factor is changed at one time.

Check that light intensity and the room temperature is kept as consistent as possible so that the test remains fair.

I have chosen to change wind speed as in preliminary tests it proved to be the easiest factor to regulate and provided expected results.

**Diagram:**